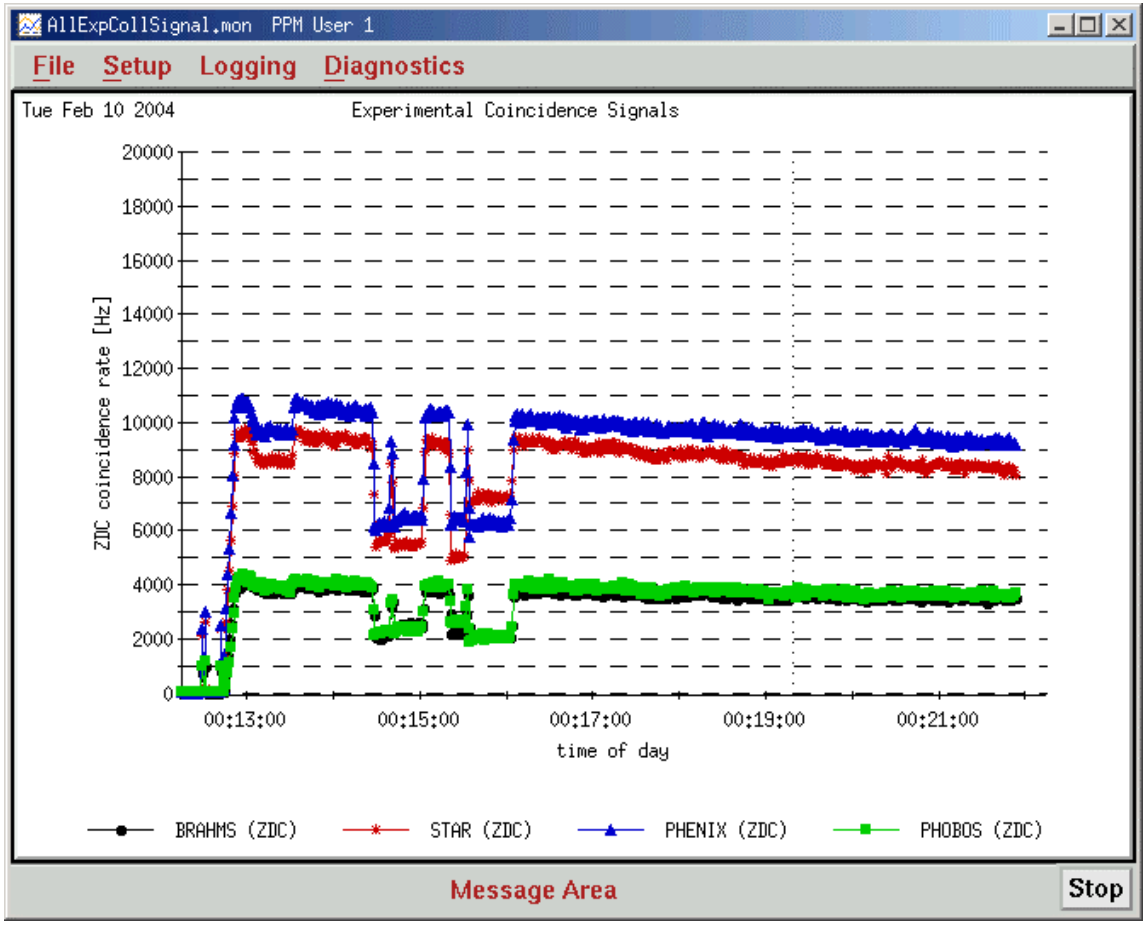
Numerous problems since last maintenance on 02/04/04 are holding peak luminosity and time in store down. Among those are:

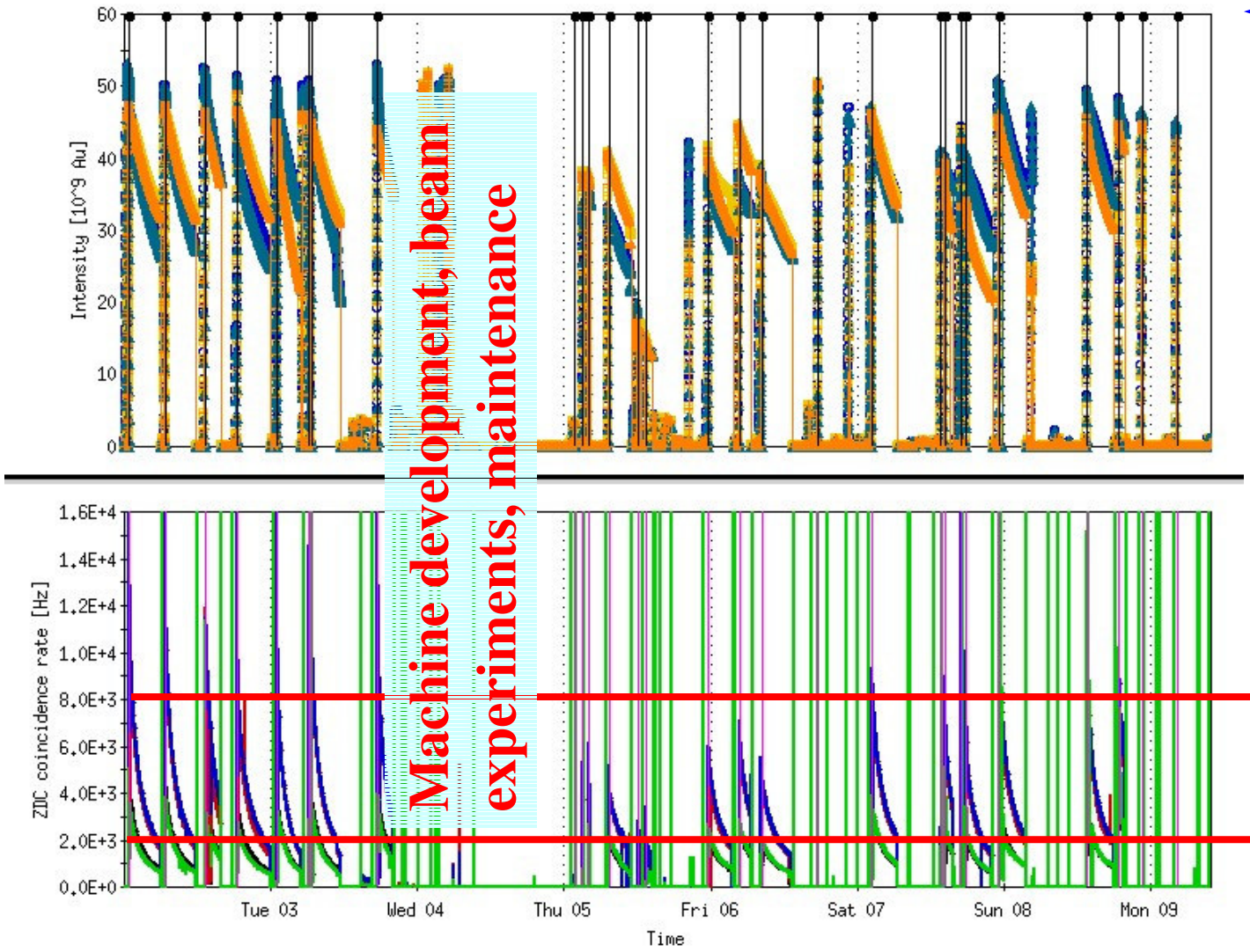
- Tandem sparks and low intensity from Tandem
- Recurring lead flow problems
  (after reducing helium leakage, communication problems)
- 2 DX heater fires from Brahms D3 operation
- Missing BPM data during ramp (from collimation on ramp) and at injection
- QLIs for various reasons
- Low AtR transmission
- Booster MMPS and rf problems
- FEC reboots and replacements
- Phobos background

Some positive news: Parallel IR steering in less than 2 min (was about ½ hour during last run)



Ted D'Ottavio
Angelika Drees

Stores during last week, Monday to Monday



Machine development, beam experiments, maintenance

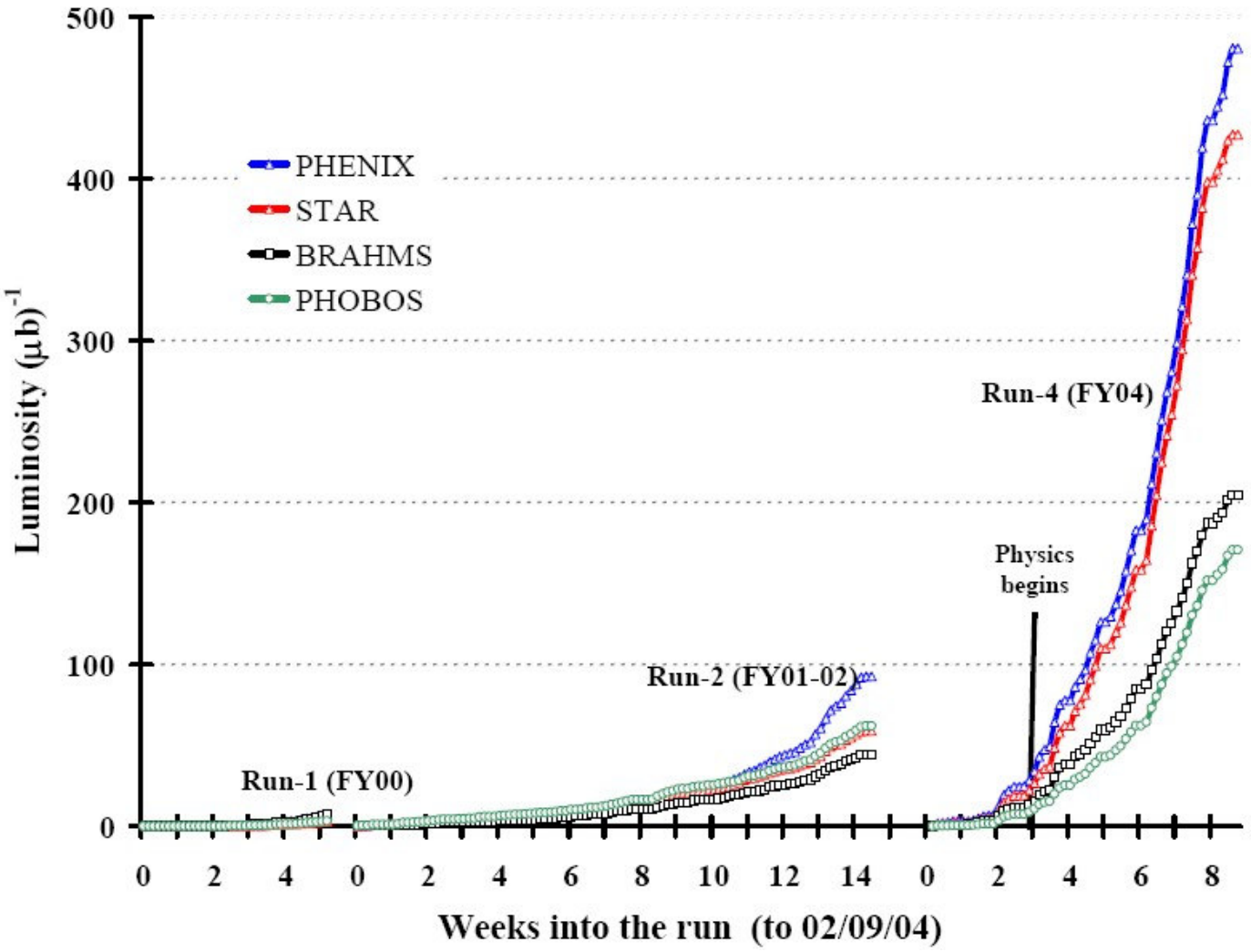
60e9 Au intensity

enhanced luminosity

design luminosity

Delivered 481(μb)$^{-1}$ to Phenix [week ago : 390]
90 (μb)$^{-1}$ last week [best week: 139]

As of 02/08/04 24:00
Star ×0.9
Phobos ×0.3
Brahms ×0.4



physics target

minimum projection

Some statistics (week 2-Feb to 8-Feb), maintenance week

- No of stores : 15
  Time in store : 64hrs (38% of calendar time)
- Average store time : 4.0hrs
  Rms store time : 1.2hrs
  Min store time : 1.5hrs
  Max store time : 5.4hrs
- Av. store-to-store time : 4.3hrs (ex beam exp. & maintenance)
  Rms store-to-store time: 8.8hrs
  Min store-to-store time: 0.7hrs
- Optimum store length : 3.6hrs (for zero detector turn-on time)

NEG pipe and other vacuum issues

- Intensities in both rings are limited by pressure rises
- Luminosity is further limited by background in some experiments (PHOBOS, STAR)
- Most likely dominating effect is
  - Electron cloud formation by beam
  - Gas desorption from electron bombardment of walls

→ For higher luminosities we need a vacuum upgrade for Run-5

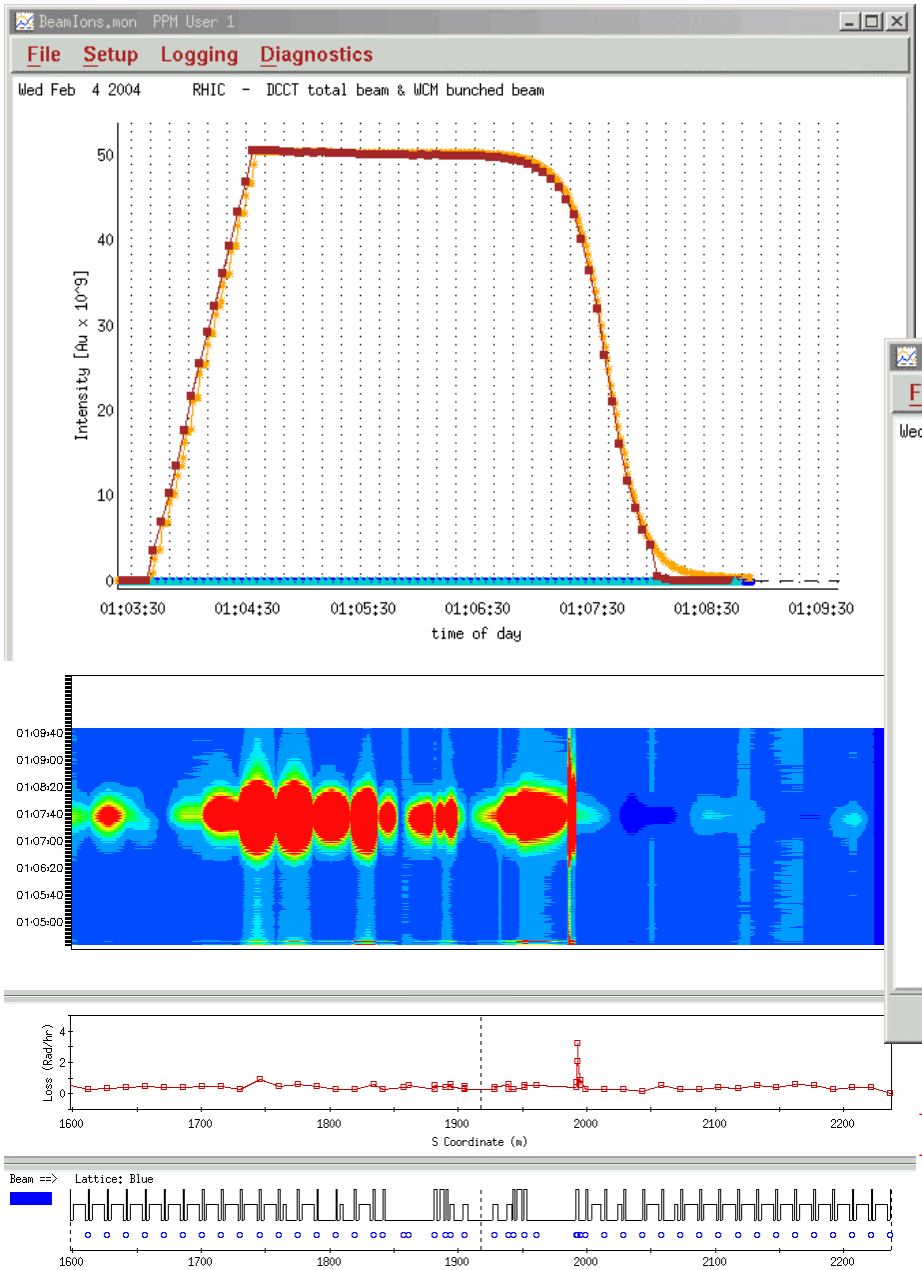
(little can be done for Run-4)

NEG pipe and other vacuum issues

- Reduce e-cloud formation
  - Optimum bunch pattern (already in use)
  - Baking (challenge for shut-down schedule)
  - Coated pipes for low secondary electron yield (Ti, TiN, NEG)
  - Solenoids on beam pipes (~50 Gauss)
- Increase pumping speed
  - NEG coated pipes
- Need to address common beam sections (experimental areas) first

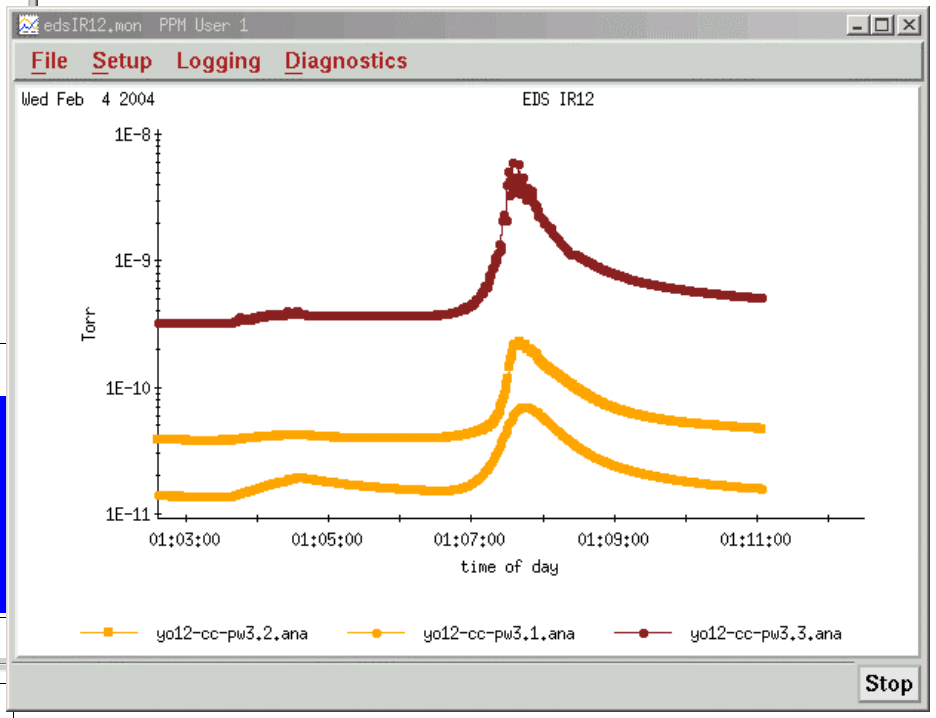
- Installed 60 m of NEG coated pipes in selected warm regions **H.C. Hseuh**
  - For evaluation purposes
  - To reduce background at Phobos
- NEG coated beam pipes
  - Coating done by SAES Getters, Milan, Italy
  - ~1μm sputtered TiZrV layer (30%–30%–40%)
  - Activated with 2 hrs baking at 250°C
    (can be done with 24 hrs at 180°C)
  - Expected speed of 300 $l \cdot s^{-1} m^{-1}$ with load of 1e-5 $Torr \cdot l \cdot cm^{-2}$ (based on CERN data)
    [~ a pump every meter]
  - Expected SEY of 1.4 (after activation) to 1.7 (saturation)
    [SEY of Be ~2.8, no reduction from baking]

NEG coating setup at SAES Getters



H. Huang, S.Y. Zhang et al.

NEG evaluation: pressure rise vs beam loss



Less pressure near NEG coated pipes

Brahms

Plan by H.C. Hseuh

- Minimum
  - Commission the existing solenoids (4 – 7m from IP)
- Advanced
  - Bleed up and replace stainless steel pipes (4 – 7m) with NEG
  - Rebake & activate NEG; commission the solenoids
  - Additional solenoids on central Be-Al pipe (supports)?

Phenix

- Minimum
  - None
- Advanced
  - Bleed up and replace the south st. steel pipes with NEG coated ones
  - Replace the north st. steel pipes with NEG coated one (requires removing the IP Be+SS pipe and central magnet)
  - Coat the IP Be+SS pipe with NEG (development?)
  - Solenoids of 1-2m at both ends?

Phobos

Plan by H.C. Hseuh

- Minimum
  - Add solenoids at 6.5 – 7.3m
  - Add solenoids on Be pipe sections (5 – 6m)
- Advanced
  - Bleed up and NEG coat Be pipes and st. steel pipes (R&D?)
  - Bake and activate NEG

Star

- Minimum
  - None
- Advanced
  - NEG coat the st. steel pipes (4.5 – 7m)
  - Add solenoids on st. steel pipes